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(51) INT CL<sup>5</sup>

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(52) UK CL (Edition L)

**A1F FBA FEG FFF F102 F112**

(56) Documents cited

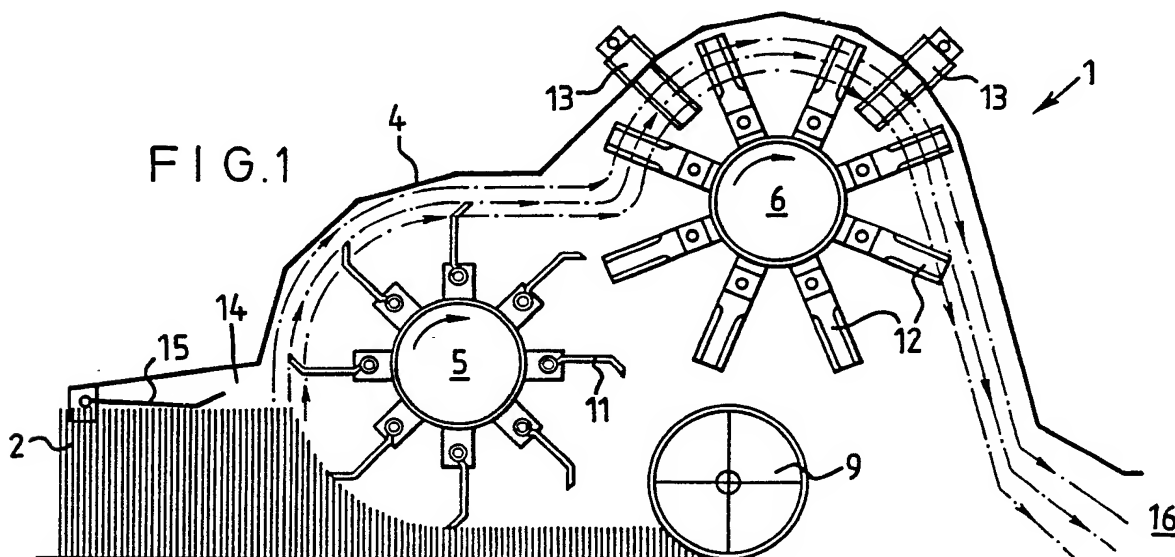
**GB 2057238 A GB 2012540 A**

(58) Field of search

**UK CL (Edition L) A1F FBA FCA FDC FDH**  
**INT CL<sup>5</sup> A01D, A01F**

(54) **Apparatus for comminuting crop residue**

(57) Apparatus 1 comprising a cowl or housing 4 within which is mounted a cutter 5 for cutting standing crop residue 2, at or adjacent ground level, and a comminuter or chopper 6 for comminuting the cut crop and other residue from the cutter 5, the comminuter 6 and cutter 5 being rotatable about respective axes which in use are substantially horizontal, are laterally offset, and are mounted on a line which extends in the angular range 0-50° from the horizontal, preferably 45°-25°. In the embodiment the angle is 27.5°. An adjustable height roller 9 serves to act as a baffle for assisting air flow through the apparatus.

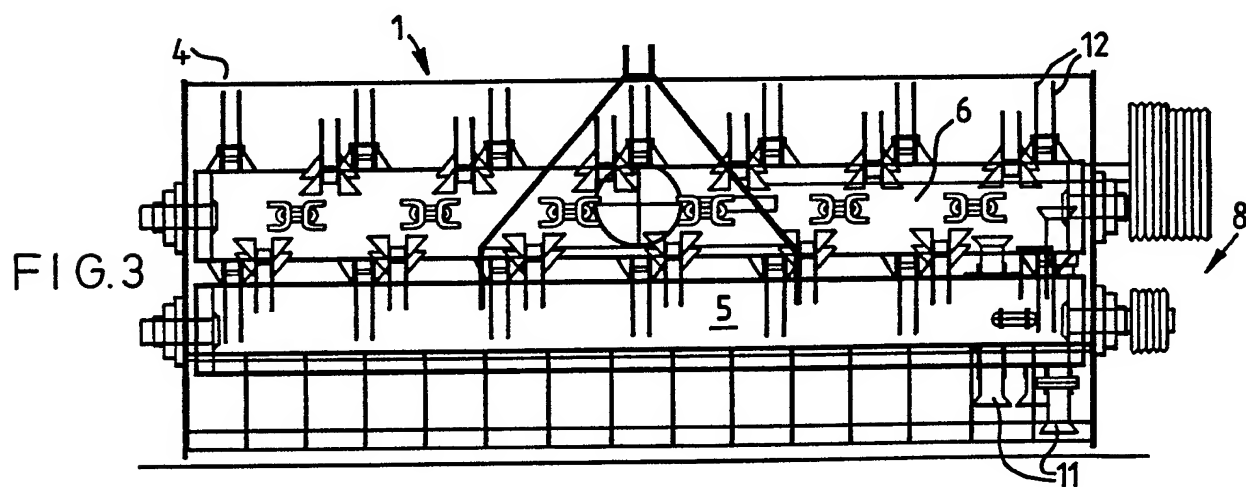
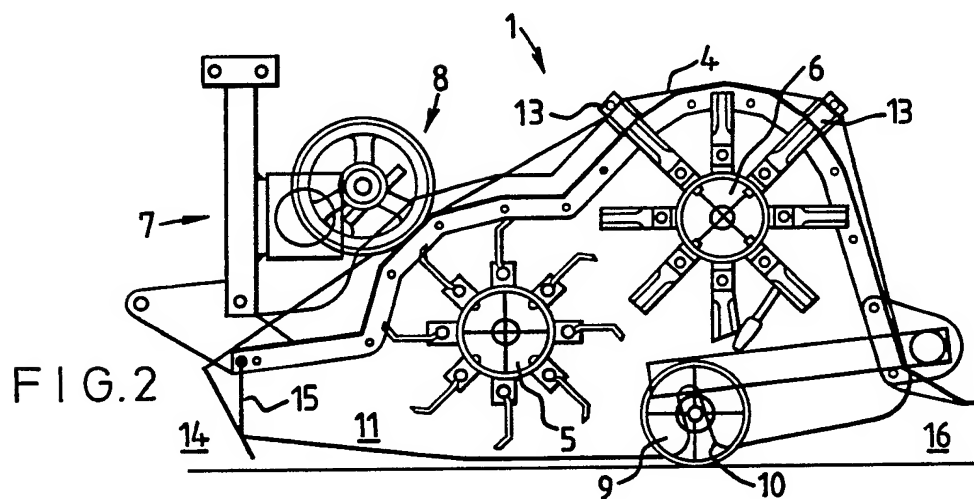
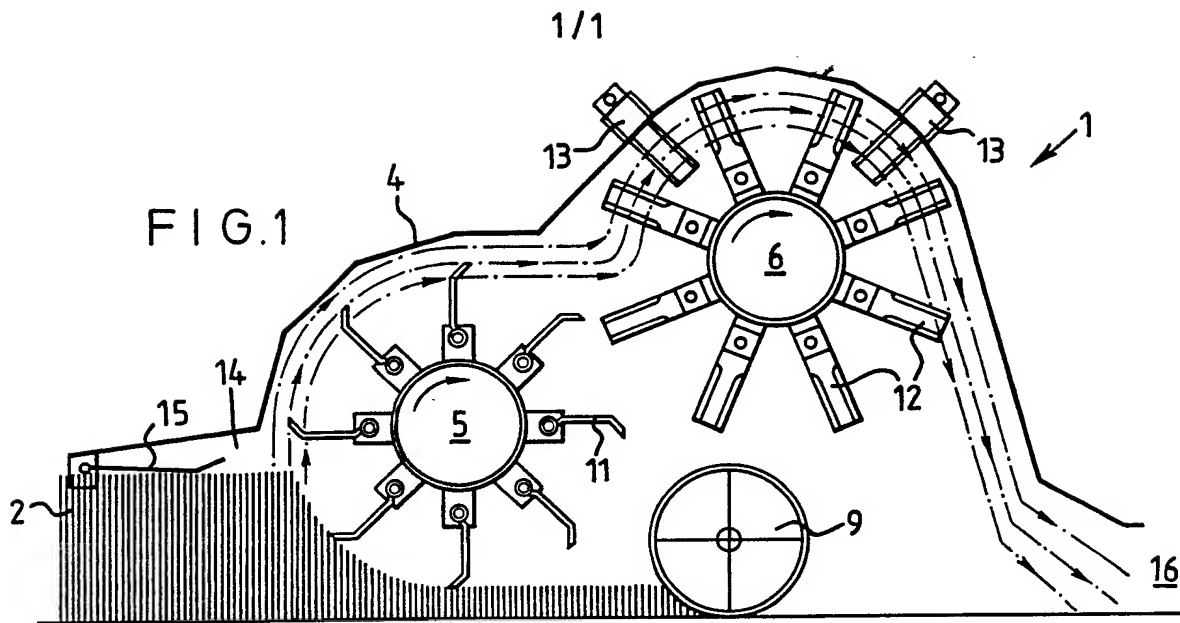


At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

The print reflects an assignment of the application under the provisions of Section 30 of the Patents Act 1977.

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## APPARATUS FOR COMMINUTING CROP RESIDUE

The invention relates to apparatus for comminuting crop residue, for example straw stubble.

The ban on straw burning coming into effect in 1992 will require that new methods are devised to aid straw incorporation in the ground. Straw choppers are already available as towable units or mounted on a combine harvester but in heavy ground they do not provide cut straw which can readily be incorporated in the ground using discs. Other problems encountered with existing machines are that they are unable to cut short stubble to the shortest possible length, and also require significant hp from the combine engine to operate, which places strain on the combine which may already be working at full capacity.

It is an object of the invention to seek to mitigate these disadvantages of the prior art.

According to the invention, there is provided apparatus for comminuting crop residue, comprising a cutter for cutting standing crop residue at or adjacent ground level and a comminuter for comminuting crop residue from the cutter, the comminuter and cutter being rotatable about respective axes which in use are substantially horizontal, are laterally offset and are mounted on a line which extends in the angular range  $0^{\circ}$ - $50^{\circ}$  from the horizontal.

The range may be  $45^{\circ}$ - $25^{\circ}$ , preferably  $27.5^{\circ}$ .

The apparatus may comprise baffle means internally thereof for assisting in air flow through the apparatus.

The baffle means may comprise a ground engaging roller means which may assist in passage of the apparatus over the ground.

The ground engaging roller means may be adjustable vertically as considered in use. This provides for height adjustment of the whole apparatus and hence the length of stubble left standing.

Apparatus embodying the invention is hereinafter described, by way of example, with reference to the accompanying drawings.

Fig.1 is a schematic side elevational view of apparatus for comminuting straw stubble, according to the invention;

Fig.2 is schematic side elevational view of actual apparatus according to the invention, and

Fig.3 is an enlarged elevational view of the interior of the apparatus of Fig.2, with parts omitted for clarity.

Referring to the drawings, there is shown apparatus 1 for comminuting crop residue 8 such as standing stubble 2 and cut stubble 3 residue lying thereon or intertwined therewith. The apparatus 1 comprises a cowl or housing 4 within which is mounted a cutter 5 for cutting the standing crop residue 2,3 at or adjacent ground level, and a comminuter or chopper 6 for comminuting the cut crop and other residue from the cutter 5, the comminuter 6 and cutter 5 being rotatable about respective axes which in use are substantially horizontal, are laterally offset, and are mounted on a line which extends in the angular range 0-50° from the horizontal, preferably 45°-25°. In the embodiment the angle is 27.5°.

The apparatus 1 is towed behind a tractor (not shown) for which purpose it has connections 7 (Fig.2) for hitching to towing gear of the tractor, and power take off means in the form of pulleys 8 (Fig.3) which are connectible by say V-belts with the power output from the tractor, the pulleys being connected by V-belts say to rotate the cutter and comminuter at, respectively 23000 rpm and 2000 rpm.

Mounted interiorly of the cowl 4 is a baffle means 9 which comprises a roller extending the full width of the apparatus 1 and which is adjustable in height by suitable adjusters, an axle of the roller being set in blind slots 10 in side cheeks 11 of the cowl 4 for this purpose. The roller 9 maintains the apparatus 1 at the desired height above the ground and maintains the cutter 5 blades 11 at that desired height as the roller 9 sets the apparatus 1 to the highest local point over which it passes and therefore maintains the blades 11 close to, but just above, the ground. Therefore, the roller 9 is as close as possible to the blade tips 11 at their maximum extent, and is of relatively large diameter (about 25cms, 10 inches).

The blades 11 of the cutter comprise V-shaped scoops which are pivotally mounted and extend across the cutter drum, being concave forwardly in use. The blades are set in rows which overlap, so providing effectively a complete or "solid" blade across the apparatus. The blades are not reversibly mounted.

The comminuter 6 has pivoted bar shaped blades 12, arranged in pairs which interdigitate with two rows of fixed blades 13 protruding through the cowl 4. (There could be a single row of fixed blades).

The tips of the respective blades 11, 12 of cutter 5 and comminuter 6 are spaced about 17mm apart.

At the forward end of the cowl 4, there is an inlet 14 and a pivotable stop 15, comprising a plurality of stop plates extending the width of the apparatus, to prevent egress of stones etc. The rearward end of the cowl 4 has an exit 16 for cut crop residue.

The side cheeks 11 of the cowl have slides on which the apparatus 1 is, with the roller 9, supported over the ground. The arrangement is such that the effective only entry for air is at this inlet.

In use, the apparatus 1 is drawn over the ground. The cutter 5 cuts the stubble and that cut stubble, with crop residue lying thereon, is passed by the cutter 5 along the cowl 4 to the comminuter 6, where it is cut by the blades 12 thereof and the fixed blades 13 into relatively fine size and is expelled from the exit 16 where it then lies on the field and can thereafter be incorporated even in heavy ground with light discs.

During operation, the crop 2,3 is always thrown by the blades to the outside to the cowl, and is therefore always urged from the inlet to the exit. It is carried by an air stream which is sucked in through the inlet 14, and flows along the cowl 4, the roller 9 acting as a baffle to prevent the air passing interiorly towards the inlet 14, and the shape of the blades 11 acting to "scoop" the air in the direction indicated in dotted lines in Fig.1.

CLAIMS

1. Apparatus for comminuting crop residue, comprising a cutter for cutting standing crop residue at or adjacent ground level and a comminuter for comminuting crop residue from the cutter, the comminuter and cutter being rotatable about respective axes which in use are substantially horizontal, are laterally offset and are mounted on a line which extends in the angular range  $0^{\circ}$ - $50^{\circ}$  from the horizontal.
2. Apparatus according to Claim 1, the angular range being  $45^{\circ}$ - $25^{\circ}$ .
3. Apparatus according to Claim 2, the angle being  $27.5^{\circ}$ .
4. Apparatus according to any preceding claim, comprising baffle means internally thereof for assisting in air flow therethrough.
5. Apparatus according to Claim 4, the baffle means comprising a ground engaging roller means adapted for assisting in passage of the apparatus over the ground.
6. Apparatus according to Claim 5, the ground engaging roller means being adjustable vertically as considered in use.
7. Apparatus according to any preceding claim, the cutter comprising blades.
8. Apparatus according to Claim 7, the blades of the cutter comprising substantially V-shaped scoops, which are pivotally mounted.

9. Apparatus according to Claim 8, each cutter scoop being forwardly concave in use.
10. Apparatus according to Claim 8 or Claim 9, the blades being set in rows which overlap.
11. Apparatus according to any preceding claim, the comminuter comprising pointed bar shaped blades.
12. Apparatus according to Claim 11, the bar shaped blades being set in pairs which interdigitate with two rows of fixed blades of the apparatus.
13. Apparatus according to any preceding Claim including means to obviate ingress of stones or the like.
14. Apparatus for comminuting crop residue, substantially as hereinbefore described with reference to the accompanying drawings.



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**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

GB 9119034.8

**Relevant Technical fields**

(i) UK Cl (Edition L ) A1F, FBA, FCA, FDC, FDH

(ii) Int Cl (Edition 5 ) A01D, A01F

Search Examiner

R F PHAROAH

**Databases (see over)**

(i) UK Patent Office

(ii)

Date of Search

19 JANUARY 1993

Documents considered relevant following a search in respect of claims 1-14

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB A 2057238 (A W KIDD)	1-4, 7, 8, 9, 11, 12
X	GB A 2012540 (A W KIDD)	1-4, 7

Category	Identity of document and relevant passages	Relevant to claim(s).

### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**&:** Member of the same patent family, corresponding document.

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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**INT-CL (IPC):** A01D050/02

**EUR-CL (EPC):** A01D034/43 , A01D043/08

**ABSTRACT:**

CHG DATE=19990617 STATUS=O> Apparatus 1 comprising a cowl or housing 4 within which is mounted a cutter 5 for cutting standing crop residue 2, at or adjacent ground level, and a comminuter or chopper 6 for comminuting the cut crop and other residue from the cutters, the comminuter 6 and cutter 5 being

rotatable about respective axes which in use are substantially horizontal, are laterally offset, and are mounted on a line which extends in the angular range 0-50 DEG from the horizontal, preferably 45 DEG -25 DEG . In the embodiment the angle is 27.5 DEG . An adjustable height roller 9 serves to act as a baffle for assisting air flow through the apparatus. 